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ORGANIC GARDENING

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USE ONLY HOME-MADE ORGANIC FERTILIZERS

AUGUST, 1943

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J. I. Rodale, Editor | Sir Albert Howard, C.I.E., M.A., Associate Editor

With the Editor

Federal Program

(Part II)

IN the June issue I suggested the creation of a huge land army after the war, something similar to the CCC of prewar days, except that it would be much larger. This program is advocated for two reasons: first—it would absorb some of the boys mustered out of the army who will be physically trained and able to do such work; second—it would save the soil of our country.

It is strongly advisable that part of this army continue the wonderful work they have already started, namely, reforestation, and control of soil erosion. But a substantial increment of man-power should be made available to preserve organic wastes, which today are shamelessly dissipated, and to apply them to the enrichment of the land.

The other day I spent a few hours at the Allentown, Pa. city incinerator, observing the kind of organic, living materials that are consigned to the flames. Here is an entire truck-load of egg shells from a chick hatchery, burned up. The truck driver tells me he brings two loads every week. Egg shells are practically pure calcium which could be ground up into a powder and used as a fertilizer. There are thousands of chick hatcheries in the United States. What happens to all of the egg shells?

Next arrives a load from a wholesale grocer which consists of vegetable tops, spoiled oranges and lemons, etc. Such material is extremely valuable but must not be applied raw to the land. By an easily controlled process of composting this vegetable matter can be rotted and turned into humus with high fertilizer value.

There come loads and loads of stuff from poultry shops, fish stores and sundry processing establishments which is sad indeed to behold. We are a "have" nation and are growing more and more careless. We have more gold than the rest of the world combined but you can't eat gold. When the top soil of our farms has been sliced down to a dangerous

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level will we use our gold as fertilizer? When we reach such a point will statisticians and economists try to solve the problem by manipulating and adjusting figures and balance sheets?

The Tenant Farmer Problem

More and more farms in this country are being turned over to tenants to operate. This situation is really alarming. I believe the statisticians show that about half the farms of the United States are rented out to others. And these renters are not only *okies* or southern share-croppers made notorious in the play, "Tobacco Road". There are great numbers of tenant farmers all about us. An investigation recently in the southern tier of New York State showed that about half the farms there were tenant-operated.

These tenants usually work on a year to year basis. They never know when their lease will be terminated. As a rule they cannot afford to put too much of an investment in the land in the form of animal manures because the benefits will accrue for ten and even twenty years and they may not be there to benefit from it. I know of a big operator type of tenant farmer. He owns a lot of equipment but not one foot of farm land. He farms about seven or eight neighboring farms totalling more than 500 acres and uses very little animal manures. His farming is done almost exclusively with artificial fertilizers. That is not a healthy condition for our farms.

The other day I passed a farm and saw a sign which read, "Manure for sale". There was only one logical interpretation. That couldn't be other than a tenant operated farm. I purposely stopped and talked with that farmer and true enough, he was merely a tenant on the land. A man who owned a piece of land would never sell his manure.

There have been flagrant cases of farm families who have criminally abused the soil. They will rent a place and work it for all it is worth. For example they might grow corn for 5 years successively on the same piece of land without the proper rotation and with much chemical fertilizers. They do not build up the land. On the contrary they *"mine"* their farms. And when the soil loses its productivity they move on to more fertile fields.

Of course there are some tenants who love the soil and who do a first rate job. They keep up the organic structure of the soil by using plenty of manure. But they are not in the majority by any means.

All these facts about tenant-farmers are given to show the advantage of having a land army to see to it that plenty of humus-making substances are put into all farms, whether operated by owners or renters. If this is not done, who is going to suffer? The public will get food that is raised on depleted, dead soils, which condition will not be improved by dumping high powered, corrosive chemicals into the soil. There is sufficient evidence already at hand to show that food raised on soils which are fertilized by manures, composts and other natural materials have more vitamins than that raised by the exclusive use of the artificial fertilizers. Therefore, the work done by a land army would be so beneficial to the general health of the public that its value must not be measured in dollars and cents. A public made more healthy by the eating of full-bodied food will not only find its bodies made more strong but its minds functioning more clearly. It can then go forth and create more cultural values as well as more material wealth, which in the end will more than compensate for the expense of operation of the land army.

Unhealthy Weeds

In part I, mention was made of the valuable work the land army could do in eradicating rag-weed which is the cause of hay fever. Everybody talks about this vicious weed but nobody does anything about it. Every year citizens of this country spend millions of dollars taking trips to certain places that are free from ragweed. Millions of others suffer horribly. The medical profession has developed all kinds of torture inoculations, injections, metalizing the membranes of the nose and what not to alleviate the sufferings caused by hayfever. Most cities have ordinances making property owners liable if they do not eradicate these offensive weeds. Unfortunately, these laws are rarely enforced. The land army would not only keep these noxious weeds in check but at the same time turn them into an excellent natural fertilizer.

Poison ivy is another notorious offender. Victory gardeners were hard hit, especially this year of 1943. Hospital cases were many. Nature lovers year after year are smitten. City people are in fear of taking trips into the country on account of this loathed weed. Here is work for a land army which would learn how to

eradicate this uninvited pest and make it stay eradicated.

There are many other seriously harmful weeds. Take the case of the mustard plant. It is believed that this causes difficulty of breathing to many persons who are suffering from respiratory conditions. This weed appears in the early spring. Many persons suffer from weed poisoning which is caused by dozens of different outlaw plants. Scientists of the land army could do research work in connection with all weeds and determine the good and bad features of them all. Some weeds have very beneficial characteristics.

Unfarmed Land

There is considerable unfarmed acreage on which the land army could grow certain kinds of clovers, alfalfa, etc. and use these crops to make composts similar to the way the Chinese do, for the purpose of fertilizing the soil. Some method could be worked out by which the farmer could get such composts by paying a small sum. In China the scrapings from the bottoms of canals are combined with such green crops, to make a very excellent kind of compost.

We might look to the soil which washes off our fields after rains, and finds its way into ditches, creeks and out to sea. Our land army might catch this soil along the route somewhere, and use it along with green crops as described above.

Conclusion.

The suggestion for the creation of a land army to help the farmer improve the mechanical structure of the soil may appear revolutionary but in the long run it will more than pay for itself in increased farm yields, reduction of plant and animal diseases, and insect infestations and most important of all, it will create a healthy nation of people. It will retard soil erosion and make the soil easier to cultivate.

This plan is respectfully submitted as one of the means of combatting unemployment and at the same time of saving the soil of our country.

J. Rodale

The Ross "No Weed" Gardening Method

Reprinted from the Scarsdale (N. Y.) Inquirer.

NOT being a farmer ourself we may not make sense. But the Three-Story Garden does.

Last winter Dana Caulkins of the Westchester County Recreation Commission and C.M. Burchard who had conducted a pretty good Victory garden last summer, got talking about ways to make an even better one. They happened on a tome written fifteen or more years ago by A. B. Ross. It was called "Big Crops from Small Gardens," and advised a somewhat unorthodox procedure.

Sounds worth trying, they decided. But just to make sure of the thing, they planned half of their garden the Ross way, and the other part, by the old-fashioned or Caulkins-Burchard method. Mr. Ross won out.

Back in the Winfield D. Loudon place on the Old Army Road is where the experiment was tried. Mr. Loudon gave them the use of the ground and he shares in the vegetable dividends without lifting a hoe.

The two plots are each thirty-seven by fifty feet, and were ploughed and started at the same time. Ploughing was done around March 24. The "old-fashioned" garden will not be touched on further as that variety is well-known to a number of the inhabitants of the village—rows of vegetables some two feet apart with plenty of earth between for a good crop of weeds.

This Is the Idea

The Ross idea is (in extreme-

ly simplified form) to keep the garden completely planted all the year 'round; to have the rows only eighteen inches apart; and to plant legumes (peas and/or beans) on every other row. The legumes increase the available nitrogen in the soil.

Mr. Ross engages to produce four times the usual amount of vegetables from a given area. A war-time bonanza.

Here are the three stories—first, onions, lettuce, radishes, carrots, cabbage, kohlrabi, peas and bush beans; second story, tomatoes and corn; third, pole limas and Kentucky wonder pole string beans. (Don't ask us about the "stories"—read the book.)

Now this garden planning hasn't been a catch as catch can affair. It involved study of the book; making of charts for planting and replanting, which are tacked up on the wall of the Loudon barn. The rows are numbered, and the minute certain vegetables are picked and done with, there is one of the gardeners with new seeds for that particular section. Sometimes the seeds are put in alongside of the first crop to be sure no time is lost.

Any doubter not convinced by these words or the picture of the Three-Story Garden, will be crushed by this. The Caulkins - Burchard families have already had served at their tables fine bleached cauliflower, and tender cabbages. Match that!

The real pay-off in this garden is that weeds don't thrive. There were a few at first, before the plants got going. Then the vegetables began arching toward each other like elms in an old New England town, and the sun couldn't reach the weeds.

Remember how hot it was Monday—and how hot for two weeks before that—and no rain fell? The ground was moist on the surface in some places in the Three-Story Garden, and a pencil pushed into the ground anywhere showed moist soil an inch down.

"The vegetables looked so thick that we were scared at first," comments Mr. Caulkins. That isn't what has been scaring many Scarsdale gardeners!

A reader of the Inquirer sent in the following letter:

To the Editor:

The article in The Inquirer for July 2 describing Messrs. Caulkins' and Burchard's experience with the gardening principles of A. B. Ross, should be very stimulating to increased yields next year. In normal times if a gardener wants to operate at 25% of possible efficiency, that is his prerogative; but with a war on and a food shortage, a method that not only promises, but delivers, four times the yield per unit of land, with very much less labor than the conventional method uses, should engage the thoughtful attention of every Scarsdale farmer.

It needs no comment from me to recall that this was a wretched spring for an early start under any system of gardening. But even with the season retarded a month, the Ross garden of Messrs. Caulkins and Burchard has made a very impressive showing, much better than the conventional half, which was run (1) as a control and (2) as a hedge in case the Ross claims did not pan out.

There is no magic or hocus-pocus in the Ross methods. Mr. Ross' success is based on his letting Nature give him a hand instead of bucking her. For example: Nature does not let ground lie bare, as you can well appreciate if you try to keep the ground bare between your rows of vegetables. Either Nature will fill up that space with weeds, or you will spend an awful lot of time and effort in hot weather, fighting the weeds. Ross beats the weeds to it by filling up the space with vegetables. In Ross' own words, "the sun is the power-house of all plant life, and the shade from the dense growth of desired vegetation inhibits the weeds." It also inhibits evaporation of water from the soil. The Inquirers' story of July 2 made mention of the moisture in the soil, despite two weeks of hot dry weather. Ross does not use any water for his garden except the rain. The saving on water-bills is not to be sniffed at.

If the Ross book, "Big Crops from Little Gardens," were out of print, there would be justification for a resume of his principles here. However, Minton, Balch, and Company inform me that the volume, published in 1925, is still to be had. It will provide unlimited entertainment for the stove league garden season, and will pay huge dividends in the form of increased yields, reduction of labor, and elimination of watering bills. Any skepticism as to the validity of Ross' claims will never survive an inspection of the Caulkins-Burchard garden.

The gardener who adheres to the conventional method, attempting to keep bare ground between the rows, will doubtless expend much effort in a discouraging battle against purslane (Portulaca oleracea),

that well-known creeper with a red stem, and opposite green succulent fleshy leaves shaped like the blades of a marine propeller. When I found in Grays' Botany that the thing was introduced from Europe, I wondered why. Pursuing the subject further, I found in the Standard Dictionary that it is esteemed in Europe as a salad and pot-herb, but is regarded as a weed here. In all probability some early gardener brought it over as a vegetable, and the seeds were widely spread by birds. Appreciation of its edibility was forgotten, but the weed remains. Feeling, in the face of the Standard Dictionary's statement, that it was safe to eat, I picked some of it, and after washing it well, added some of the French dressing made by our fellow-townsman Mr. Hellmann. Folks, you don't know what you have been missing. We smile at our ancestors for raising the love-apple for ornament when they were afraid to eat it, and all along we have tried, none too successfully, to keep our tomato-patches clear of purslane, which in my opinion is away ahead of lettuce as a salad green. It grows in close relation to the soil, but it can be washed, and if you eat radishes, you need not shy away from purslane. But don't rush to the conclusion that because purslane is Portulaca Oleracea, the portulaca of the flower garden is good to eat. I tried that too, and as Joe Cook said about dry cereal without milk, it's no good and you can take my word for it.

Ramsey Spillman

Minton, Balch & Company's address is as follows:
2 W. 45th Street, New York City.

We are looking into this book and will give more details about the Ross method in future issues of ORGANIC GARDENING.

Hints For the Victory Gardener

This is the ninth of a series of articles by this author dealing with the cultivation of ordinary vegetables.

By Roger W. Smith

SWEET CORN

EVEN though there isn't room in the average Victory garden for sweet corn, you will be likely to plant a few short rows anyway. Sweet corn is truly a native American and has its own irresistible appeal to the gardener.

The plant itself is a mysterious and fascinating thing. It is one of the very few plants upon which mankind depends, and which is America's presentation to the food plants of the world, which is not insect pollinated.

The origin of sweet corn is obscure. A fossilized ear of corn, much like that grown today, was discovered in Peru and was accepted by the best authorities as being more than a hundred thousand years old.

Much modern investigation has failed to explain how those ancient Peruvian Indians developed the plant. It seems probable that they succeeded in crossing several distinct species of wild grasses to produce that super-plant, the sweet corn, something almost impossible by modern plant breeders. The religious practices and the social life of many recent Indian tribes have been centered around the planting and growing of corn.

You will find that sweet corn will grow in a new and roughly made garden where other plants would fail. It will succeed almost anywhere provided it is given full sunlight for the five months of its growing period and good drainage.

The pioneer families planted corn on the newly broken hillsides and depended upon it for their subsistence in areas where other crops would have failed.

Sweet corn does best in open

sunny locations. It requires plenty of rain during the warm period, the warmth being very necessary for its mature growth.

You will find that it is best to plant sweet corn in many short rows about three feet apart to form a block. This is because the plant is wind pollinated and this form of planting makes it easier for the wind-born pollen to perform its mission.

If you can afford room in your garden it is a good plan to set aside a special area for your corn. But if your garden space is limited and you decide to grow sweet corn anyway, you will find that it is possible to do it by using the companion-cropping method.

You decide to consider this matter of companion cropping. Suppose you decide to plant six short rows of sweet corn placing the rows three feet apart and planting the seed corn in hills. You plant three seeds to the hill and place the hills three feet apart in the row.

Between each hill you will see that you have three feet of row space which might easily be used for either some low growing vegetable or for some very late one.

A very good method is to fill in this space with some vegetable which will thrive there, such as onions.

Many plants do best if planted in moderately shaded places and you will find that head lettuce will head up much better where it will receive the slight shade offered by the growing corn.

Another method is to fill this space with late plants such as late, storage cabbage which will remain growing long after the corn stalks have been removed.

An old favorite was to plant a few hills of squash or pumpkin in every third row of sweet corn. These succeed well although they sometimes hamper the cultivation of the corn.

Whichever plan you adopt, you will find that it is best to have the ground well fitted for the growth of the plant. True, the soil may be rough and newly tilled but the location should be fertile and well drained both as regards soil drainage and air drainage.

The sweet corn we grow today is just as rugged as the plant the pioneers raised upon the rough hillsides. Even so it will not thrive under unnatural conditions.

Experimentally, sweet corn has been raised and the ears gathered under very difficult conditions. A layer several feet thick of mature compost humus was anchored upon the sloping roof of a barn. Sweet corn thrived under these conditions so that the crop was not less than that grown under ordinary garden conditions.

Just the same you will find it pays to prepare your garden and do the planning well in advance of the planting especially if you intend to do any sort of companion or succession cropping.

First you select the location where you intend to plant your sweet corn. The place, naturally, should be sunny and well drained even though it may slope considerably. It should be free from shade of trees and be thoroughly open on all sides. The soil may be shallow or even poor because of the erosion which often takes place on sloping ground.

Over this area place about six inches of mature compost humus. More, if you have it. Even a little of this material often goes a long way in helping the growth of sweet corn.

You remember that sweet corn thrived on the newly ploughed lands of the pioneers. It will do that for you, but it will refuse to grow in soil which has been robbed of its normal supply of humus by the long continued application of artificial fertilizers.

After the compost humus has been spread, dig the area so as to incorporate this material with the existing topsoil. If you dug your garden in the fall and allowed it to remain in the rough to be matured by the influences of rain and frost, this addition of plant food will be more easily incorporated.

Don't plant the seed of sweet corn until the ground has warmed up. You can decide this by placing your hand into the soil. Does it feel slightly warm? Or is it still chill?

A pint of seed will plant around 400 feet of row whether you plant it in drills, 18 inches apart in the row, or in hills of three seeds each and about three feet apart.

The seed of sweet corn should be planted deep and a little more than is required should be used. The resulting seedlings should be thinned out to the required number.

With seed corn, you will find that the hard shell which covers it is often a limiting factor in the speed with which it sprouts. A very old system was to take each kernel and nick the hard outer coating with a file to make it easier for the swelling seed to break its shell.

You will find that it is much the best plan to soak seed for

twenty hours in compost water.

A small amount of compost water is easily made by partly filling a jar or similar container with sifted compost humus and then pouring over it enough rainwater to cover it. This mixture should be stirred thoroughly and allowed to stand overnight. The resulting solution, compost water, may then be strained off and more rainwater poured over the compost material in the container.

Tests have shown conclusively that seeds sprout much more readily when soaked and supplied with compost water.

There are so many varieties of sweet corn available that you will find it difficult to make a choice. But if you keep in mind two points, avoid plants which will tend to produce too much shade for the rest of the garden—the tall growing kinds—and always prefer those kinds more or less resistant to disease. Perhaps Golden Cross Bantam might be your best bet.

Oldtimers often planted sweet corn one row each week beginning around the end of April and continuing the planting until the middle of July. In this way rows were coming into bearing about as fast as the old rows were harvested, and the companion crops left to enjoy the space.

The oldtimers also had a certain way of cooking sweet corn. At about the time the ears were in the milk stage and before they reached the dough stage, the oldtimers made it a rule to have a large pot of water going at a rolling boil. When the pot was boiling they went out and gathered the ears. The ears were shucked. A little sweet milk was added to the boiling water and the ears slipped in as quickly as possible to the boiling liquid.

They were afterwards served with butter, salt, and pepper to taste. Many a Victory gardener's wife might find it a good idea to try out their method.

Cultivation of sweet corn is a matter of keeping down weedy growth. It is best to avoid deep cultivation. Frequent and shallow cultivation is best, just to scratch the surface with the hoe. This is an important matter for the yield of your sweet corn depends greatly upon how well you manage to keep down weeds without doing injury to the root systems of the sweet corn plants.

You look over your seed catalogs. What about all this talk of open pollinated corn, hybrid sweet corn, double crosses, and strains of sweet corn whose names are simply number?

If you go into the matter you will find that there are still some very fine types of old-fashioned, open pollinated, sweet corn like Golden Bantam (80 days to maturity) or White Evergreen (90 days to maturity) or Country Gentleman (92 days to maturity.)

On the other hand you find sweet hybrid corn under such names as Kingscrost M13 or Kingscrost G7. There are many of these newer varieties almost all indicating by their names that they are crosses—Spancross, Marcross, Golden Cross Bantam.

Although hybrid types of sweet corn are usually superior in size of ear and form of plant to either of the plants from which they were produced, this is not always the case. Just as a mule is not always superior to both its parents. There are good types of hybrid sweet corn and poor ones.

Hybrid sweet corn tends to come into bearing at about the same time and the ears are generally formed at about the same height from the ground. This is a great advantage where mechanical harvesting is used. You will, as like as not, find it a disadvantage in your Victory garden where you are trying to spread the harvest as much as possible.

The seed of hybrid sweet corn should not be saved without risking loss in yield the following year. Hybrid sweet corn seed is available in most localities and must be produced new each year, just as a new crop of mules must be obtained by making the necessary crossing.

Whatever strains you plant, if your garden is sunny and well drained you will likely be little troubled with fungi and insect pests. These troubles usually indicate a wrong location, a damp unsunny, undrained location.

But if the crows are numerous in your locality you will find it advisable to plant your seed corn a little deeper than recommended for the type you are using.

Be sure that you do not leave any excess seed corn around and that all kernels planted are well firmed so that they will not float to the surface during the first rain and thus attract the crows.

At harvest time you will find it advisable to pick all ears just as soon as they reach the milk stage. When the tassels turn brown, watch the ears. If you do not gather them promptly the crows, if they are numerous, will make a meal of them.

But whether you decide to

plant hybrid corn or the open pollinated strains, you will like to put in a few plants of the ornamental kind which form colored ears.

These colored ears are not recommended for their flavor, they are purely ornamental. But these same ears are highly regarded around Hallowe'en. They come in mixtures of red, black, blue, and white.

If you plant some of these ornamental types of corn it is best not to save the seed of other corn growing nearby. Also if you plant sweet corn it is best not to attempt to use its seed next year.

But if you plant one of the open pollinated varieties exclusively and a plant appears which is excessively vigorous or which bears more than the usual number of ears or is extra early for your locality, you might find it worth while to save an ear or two for seed.

Before the ears are mature, paper bags should be placed over them and secured by tieing with string, not too tightly. When the ears have ripened, they should be taken into the house and hung in the attic until quite dry. The kernels may then be broken loose and stored in a dry place.

You might have got to wondering about pop-corn. Perhaps you have decided to grow a few rows just for fun, or to put five or six seeds in hills about three feet apart.

Or you might have been surprised at certain types of sweet corn of the ears which are white when they are fit for use, but which turn black when they are fully ripe.

You may have been amazed at the striking color and pattern which will show up in the ears of a small planting of the red-white-and-blue ornamental varieties.

But whatever varieties you decide to plant you will find it best to do what you can to make growing conditions satisfactory. The early pioneers did their best by plowing under virgin soil. During the fall and winter this material was broken down by the action of water and bacteria to form plant food. There is little doubt but what the pioneers wished they could do better.

You can do better, much better than he did. The material which you have collected and allowed to become vital plant food through the use of proper composting, is easily available for the use of the sweet corn which you will plant.

Sweet corn will appreciate any care you can give it. It is given to you through a long line of presentations.

In 1779 the Indians presented Lt. Richard Bagnall, U.S.A. with several sugary ears of sweet corn as a sort of peace offering. Those Indians did better than they knew for they presented to you and me and to very Victory gardener a plant which, even though the space be most limited, we feel instinctively we must grow.

If you can make room for a few short rows of sweet corn in your Victory garden you will find the growing of it well worth while. You will come into contact with that deep sense of mystery which the plant carries. The area in which it grows is covered by a quiet awe.

And when you carry a basketful of ripe ears into the house you will quickly learn to appreciate the true food value of this interesting plant.

Notes

ON vice-president Wallace's visit to South America recently, he officiated at the placing of the corner stone of the buildings for the newly created Inter-American Institute of Agricultural Sciences, located in Costa Rica. He recommended to the director the study of Sir Albert Howard's Indore Process of making humus, and the advisability of experimenting extensively with it. Wallace is an admirer of Sir Albert Howard and has lost his copy of "An Agricultural Testament" through lending it to friends...

The coffee growers of Costa Rica have been using Sir Albert Howard's method for many years. Now comes news that this process is being used with great success on several coffee plantations in Guatemala...

At Houghley in Suffolk, England, Lady Eve Balfour has started an experiment station on new lines. This consists of two similar forms side by side, the one manured with freshly prepared humus, the

other with artificials. The yield, resistance to disease of both crops and livestock will be compared. This will be followed by trials of the two sets of produce on groups of villages in Houghley. Already Lady Eve has obtained some striking results which support the view that a fertile soil is the true basis of health in plants and animals. An account of this scheme will shortly be printed in book form by Messrs. Faber and Faber (London, England)...

One of the pioneers in industry in Cheshire (England) and a group of schools in Westmoreland are providing canteen meals in which as much as possible of the food is raised from soil manured with humus only...

A reader writes that he read in a newspaper where a child died through eating a certain fertilizer it took for sugar...

A co-ordinating officer of a municipal compost scheme in South Africa writes to Sir Albert Howard, "I am busy at the moment investigating a very interesting case as regards quality in wine after vines have been fertilized with compost."

A. Lee Knowles, in the Pathfinder, offers the following suggestion to outwit cutworms:

When a plant is placed in the earth push a small stick right down beside the plant, right against the plant, whether cabbage, tomato, beet, pepper or any sort of garden plant. Not one plant in 500 will be eaten off either in the ground or on top of the ground. The stick need not be larger than a rye straw. Let it extend from about three to six inches above the earth and go down to the root as planted...

Don't forget to weed your compost heaps. Weeds will use up moisture and plant food...

Now is the time to dig a pit for winter garbage. Don't wait until the ground is frozen...

A reader writes—"I have a friend that plants her potatoes and peas in November. (This might have a better chance of working out if the potatoes are planted whole)...

Potatoes lose their vitamin C when mashed and kept hot for periods ranging from 15 minutes to an hour or more before being eaten. It is healthiest to eat potatoes with their jackets...

As the time approaches for storing home-grown vegetables over the winter it is pleasant to contemplate that organically produced vegetables will keep better...

Getting earth for use in compost heaps may be quite a chore. We will be glad to hear how readers have solved this problem...

Science News Letter in a recent issue says: "Chemical fertilizers of certain kinds destroy animal life in the soil"...

Nature's Way Best in the Long Run

From the AMERICAN EAGLE (Estero, Fla.)

UNDER the caption, "Stupidity a Disease," appears on first page of this issue an article by Dr. Juan Amon-Wilkins of Santa Fe, Isle of Pines, in which he discusses the prevailing practice of fertilizing citrus groves with mineral fertilizers vs. nature's method of soil building through the utilization of decaying vegetation, or humus as it is called, made available through a plentiful supply of moisture, either through rainfall or irrigation.

At the risk of incurring the displeasure of fertilizer dealers, be it stated herewith that, from observations over a period of years, I am inclined to agree with Dr. Wilkins to a certain extent in his views on this subject. Many years ago, in company with my old friend W. Stanley Hanson of Fort Myers, I used to take occasional week-end trips out in the wilds of interior Lee County, stocking up our old Model T tin Lizzies with provisions and with bedding for camping out wherever night overtook us.

Here and there in the course of our wanderings we encountered an occasional isolated settler's cabin or a clearing where one had formerly stood. Always there were citrus trees at hand,—usually Grapefruit, Oranges and Lemons. The healthful condition of these trees made an impression on

me that I shall never forget. The foliage was fresh and green, with no sign of scale, and the trunks were smooth and healthy as those of any tree of the forest.

The pioneer settlers who planted these trees were too remote from town to depend on mineral fertilizers, doing the best they could without them, and that they succeeded well was testified by the vigorous and healthful appearance of the trees themselves. True, they did not bear bumper crops, but what they bore was clear and bright as any to be found in the markets, and the cost of production was practically nil.

The situation, as I see it, is that the average grower is impatient of nature's methods and wants to achieve riches in a hurry. So he doses his trees with strong mineral fertilizers, forcing them unduly in growth and in the bearing of abnormally heavy fruit crops, with the result that the natural resistence of a tree is weakened and it falls a prey to scale and other pests, which necessitates spraying that often kills friendly fungus as well as insect enemies. The situation might be likened to working a man beyond his natural capacity and endurance while dosing him with whiskey and other stimulants to keep him in the production. But with reduced vitality and bodily resistance, he finally succumbs to disease, with the natural expectancy of life shortened by many years.

It is true that stimulants are sometimes advisable in emergencies. I have had small Avocado Trees that were yellowed and apparently dying from attacks of scale and wood lice. A very few drops of carbon bisulphide around the base in the immediate vicinity, while a very light sprinkling of nitrate of soda worked wonders in restoring sap flow and greening up the withered tree. It should be borne in mind, however, that this does not argue the use of nitrate of soda as a steady diet. Most people overdo it, with disastrous effects when the fact is that it should be used as sparingly as one would use salt or pepper on their food. It should also be remembered that the vapors of bisulphide are highly inflammable and it should therefore be used with caution.

I would not contend for a moment that all commercial fertilizers are harmful, those from animal sources, such as sheep and goat manure, being useful in moderation on growing plants where stable manure is not available on the grove. It should be remembered, however, that citrus trees are easily over-ammoniated, especially after having reached the bearing stage, when this should be discontinued altogether. In this connection I recall an old Norwegian boatbuilder named Danielson,—about the first settler at Bonita Springs (then called Surveyor's Creek) where he planted a grove. For fertilizer he caught fish in his fish traps which he buried under his trees. For a time his trees grew amazingly, being the envy of all who saw them, but dieback eventually set in and in a few years they were dead to the ground.

The foregoing remarks pertain solely to heavy applications of mineral fertilizers to citrus trees which stimulate them unduly. Nature's plan of utilizing humus for soil enrichment is no doubt slower, but far less expensive, insures longer life to the trees and practically obviates the necessity for frequent spraying. This means the growing of cover crops between rows and mulching the trees with the dried vegetation. I agree with Dr. Wilkins in the idea that plowing of bearing trees is injurious to the root system, but grass and weeds must be subdued, which may be accomplished very readily by the use of a disk harrow, with the disks set to cultivate lightly.

While fertilizing trees with slop water may be all right for a few trees in the dooryard, it certainly is not practical for applying to a grove of several acres or more. Where the feeder roots are not mutilated by plowing and the trees are well mulched with humus sufficient moisture is conserved to carry them through the dry season with no appreciable damage.

Concerning Mulching

From RURAL NEW YORKER

I SHOULD like to comment on the excellent article entitled Orchard Mulching by J. K. Shaw in your issue of November 28, 1942.

On my Southern Vermont farm, I adopted mulching several years ago as a means to keep down weeds, with excellent results. My house is located on a small upland plateau and around that house I have planted some 40 odd fruit trees, grapes, blackberries and blueberries, roses and iris. I use hay and pine needles for my mulch with excellent results. In addition to the advantages of mulching as recorded by Mr. Shaw, I have noticed that since I have been mulching my fruit trees, I have had no trouble with borers and the trees (except for sour cherries), have made excellent growth. I have not lost a rose bush, and the blueberries are superb.

A statement in a seed catalog to the effect that some plants like acid soil and others like alkaline gave me another tip. I mix pine needles with some of my hay mulch and sprinkle lime over some, depending of course, upon the plants. Can you publish an article some time on the studies that have been made in the chemical needs of plants? I also apply commercial fertilizer (double strength because it costs less, involves less labor and transportation) on top of the mulch. When I mulch, I mulch. Two feet of hay about my trees settles down in a year's time to two or three inches.

The trees I protect with wire screens, but last year I noticed that the mice bait in cans concealed under the mulch had hardly been touched. Perhaps the mice do not like the dank underside of the mulch. I wonder if the dampness discourages the borers, or is it the vigor of the trees that keeps them away? I have encountered many optimistic illusions in farming, but mulching is not one of them. R.J.

The reason you have had no trouble with borers in your mulched trees is probably because of the vigorous growth they have made. Borers prefer weak trees and do not like those making vigorous growth.

We do not have alkaline soils in the East, unless they have been excessively limed. Of course, the acidity does vary from slightly acid to very acid, depending on the soil and the treatment it has received.

One reason that mulched trees do well is because the mulch supplies all chemical elements (needed by the trees) more adequately than does commercial fertilizer. If you have put two feet of hay around your trees, you may well get them in a condition of excessive vigor. A mulch of that depth should last for two or three years, or more.

Mice do like the conditions prevailing a mulch. Are you sure there were mice present in your orchard? We find a mulch advantageous in mice control, because they make their runs under the mulch. Therefore, they are easily detected. Pieces of poisoned apple dropped in the runs in the forenoon of a sunny day would be pretty likely to get them.

J.K.S.

What About Insecticides?

Avoiding the use of ornamental plants which attract pests is one of the best ways to overcome the fungicide and insecticide shortage next season. In place of such insecticide-consumers as roses, dahlias and gladioli, we might substitute phlox, marigolds, calendulas and asters, both annual and perennial. Dahlias are troubled by the corn borer, on which nicotine is used. Gladioli are susceptible to thrips, for which the control has been rotenone or tartar emetic. Roses are heir to any number of insects and diseases which call for spraying or dusting at ten-day intervals—*Conn. Agr. Expt. Sta.*

Soysprouts, Hot or Cold

From The FARM JOURNAL AND FARMER'S WIFE

SPROUTED field soybeans, out of a kitchen flowerpot five days old, are so rich in Vitamin C and protein that nutritionists at Cornell University are convinced they can be substituted for meat, fresh vegetables and even fruit juice in a pinch.

The sprouts can be grown at home from any variety soybean. Eat them raw as a salad, or cook them like string beans in 10 to 20 minutes. Steamed with garlic, salt and worchestershire sauce, they taste like spicy blanched almonds. What's more, they don't have some of the gustatory habits of regular beans.

"We're 4,000 years behind the Chinese on this one," says Dr. C. M. McCay, of Cornell's School of Nutrition. "The Chinese get an average of 83% of all their protein from vegetables. Soy sprouts are one of their favorites. Any American who has eaten chop suey is familiar with bean sprouts, but most chop suey sprouts come from mung beans.

"These are ordinary field varieties of soys. The mungs grow right out of their shell and use up the bean in the process. Field soys grow just as large a sprout but leave the bean intact. We find them to be richer in Vitamin C than the mung. Furthermore, they're grown in every section of the country."

Cornell's bean-sprouting grew out of experimental work being conducted at the school by Dr. Peng Cheng Hsu, a Chinese student, who was trying to standardize a sprouting technique for the Chinese government. Dr. McCay and associates saw the bean's potential value as an emergency vitamin and protein source for the civilian population and began small scale tests with the Cayuga and Seneca varieties of soys grown in upstate New York.

Finally, after a trip to New York City's Chinatown to investigate the system used by restaurateurs and grocers, Dr. McCay built a "sprouter" pilot plant in one corner of the laboratory building. Dieticians from the College of Home Economics were called in to devise recipes for the crinkly-yellow food.

Dr. and Mrs. McCay and the dieticians were their own guinea-pigs during March. Then, on April 8, pans of baked, fried and raw soybeans showed up on the steam tables at the Cornell cafeterias. Simultaneously, the Grange League Federation began selling sprouts for 12c a lb. through its co-operative store in downtown Ithaca. Public reaction was varied; but most of the college students cleaned their plates, and the Co-op sold 100 lbs. of raw sprouts on the first day.

"If critical food shortages ever do develop in the United States," Dr. McCay is convinced, "the civilian population can live and live well on carrots, soysprouts, wheat and salt. The sprouts can be produced in immense quantities. Field soybeans quadruple their bulk during the sprouting period. They are 10% protein so that a pound of them a day fills the normal protein requirements. Furthermore, our experiments show that the sprouts are as rich in Vitamin C as the average canned tomato juice."

Oh, yes. . .In case you want to make some. . .soak a half pound of soybeans overnight in water, with a pinch of chlorinated lime in it. Next morning put them in a flower pot or some other vessel that will drain easily. Keep them covered with a damp cloth. Douse them each night with a weak lime solution (one-third teaspoon to a gallon of water; it prevents mold). Sprouts start growing on the second day, and are ready to serve on the fourth or fifth day when two or three inches long.

The Culture of Earthworms

By Cecyl Holliday

IN the spring of 1941 while visiting friends in Texas I was introduced by my host to the subject of earthworms through an article in Nature Magazine, "Harnessing the Earthworm." I was not at all attracted to these creatures but nevertheless the thought that our Florida soil might be improved by their use was tucked away in the back of my mind for future reference.

Some weeks later in Sioux Falls, S. D. I happened to see a copy of "Fact Digest" on a street book stall. Glancing casually at the table of contents I noticed "When Earthworms Turn". I purchased "Fact Digest", read the article carefully and wrote to the address given: California Earthworm Farms.

The result of my correspondence was, that imbued with the idea of soil improvement, and probably some later financial reward, I decided to test out the earthworm problem. As I had never worked with the soil I feared my inability to obtain practical profit by a correspondence course, so I went to Dr. Sheffield Oliver's earthworm farm in California for personal instruction under Miss Mary Leasure, the talented and capable director who was in charge.

I spent a month at the farm studying the soilution earthworm and its habits: this included the making of compost heaps, field trips to various ranches, groves, and gardens, to see the results of the work of the earthworm. I undertook several experiments. Requests for information arrived by every mail. One of these was accompanied by a package of Tung leaves. The writer wished to know if these leaves would be good food for earthworms. The result of my experiment showed that the Tung leaf was readily broken down and the earthworms flourished on that diet.

Convinced of the advantages obtained by the use of the earthworms I wrote to my friends, Mr. and Mrs. A. C. Bowdish in Lake Wales, Fla. about the feasibility of an earthworm farm project. They willingly cooperated for they have long been interested in soil improvement and had fertilized their vegetable garden and home grove under the direction of Dr. Albert Carter Savage, of the Savage Mineral Gardens, of Nicholasville, Ky. I sent the first consignment of capsules, 600, with instructions about their planting and care. The capsules were planted in wooden boxes and butter tubs on my screened veranda. They had to be kept moist and sheltered from the sun. After hearing that the capsules were beginning to hatch and in a few weeks to produce, I sent another consignment and still another.

At the conclusion of my course a graduation ceremony was held in the charming music room of San Encina (any visitor to Los Angeles should not fail to see "this old gray pile which stands upon the margin of the Camino Real beside the gate to the arroya crossing"). Six students from as many states, having completed the course, were presented with certificates. Mine read as follows: This is to certify that Miss Cecyl Holliday has completed with honor an intensive course of Training on the Theory and Practice of Earthworm Culture at the Headquarters of the California Earthworm Farms.
July 10, 1941. Mary B. Leasure, Director.

Armed with the knowledge gained I returned to Florida and we erected ten cement and brick culture beds in a lath house. The filling of these culture beds three feet deep by three feet square with the required mixture of soil called for several loads of black earth, compost, loam and sand. I do not advise any beginner to start on such an extensive scale, or to expend the amount this entailed. I have often wished we had only two beds! I feared that if I started in a small way and my enthusiasm for the project should wane I

might be tempted to abandon my earthworms and thus write failure across the page of experience.

Luckily the care of the earthworms is not burdensome. The beds must be kept moist and protected from excessive sun, or from cold weather. They can be left for two or three days without attendance. They should be kept supplied with food—vegetable refuse from the kitchen, corn meal, coffee grounds, etc. Here let me give you a word of warning. Beware of ants, they are the deadly enemy of the earthworm as any fisherman who has left his bait unprotected at night will tell you. Though corn meal and sugar are among the foods specified we do not feed them to the earthworms as they attract the ants. The soil here is infested with these pests and we have been fighting them from the start, invoking the assistance of the knowledge acquired by horticulturists, nursery gardeners, the State Agricultural College, etc. We have spent much time and money trying out the various methods and remedies suggested.

While our success on a large scale has not been encouraging we have had fine success with the ferns and plants in the lath house where the ants and other pests can be easily controlled. Where two plants, one planted with earthworms and another planted without have been set out, the superiority of the plant with earthworms is outstanding. In our compost beds the earthworms have worked through the material in half the time usually required by ordinary method of lime, manure and chemicals.

In a letter from the California Earthworm Farm, dated Dec. 21, 1942, Miss Leasure writes: "The value of our earthworms becomes more apparent each day, although it still requires much time and money to educate the public to that value. We continue to get many inquires from Florida, showing that people in your state really are interested in earthworms and ways to improve your Florida soil." As we have now acquired a fair measure of ant control we shall begin to let the gardeners of Florida know that they can obtain information, instruction, capsules and earthworms at the Florida Earthworm Farm. The Lake Wales paper has given us some publicity, showing a real interest in the work we are endeavoring to do.

The Moon, the Calendar and Farming

By Professor E. R. Gross, Department of Agricultural Engineering, Rutgers University, New Brunswick, N. J.

JOURNAL OF CALENDAR REFORM

FOR ages, probably from his very beginning, man worshipped the sun and revered the moon. The regular movement of the earth around the sun, causing day and night, became a factor in man's primitive thinking and so a thing of mystery to be feared and worshipped. The moon, appearing in the heavens for a short time, changing its face and then disappearing, causing intervals of moonlight and darkness, was even more mysterious. The sun was the first marker of time, making the day; the moon marked another period, nearly 30 days, hence the "moonth" or our month. As the moon supplied light to relieve the darkness of the night, some thought it was of greater significance than the sun. After all, the moon shone at night when light was needed.

It was not unlikely that primitive man found it convenient to work at night in busy seasons of harvest, in stalking game for food or in waging war against hostile tribes and wild beasts. So it is possible that man planted crops by moonlight and that this gave rise to the moon's attributes with relation to crop growth, yields and germination of seed as well as the health and growth of animals and man himself.

Exactly how it all came about we may never know, but the fact remains that even to this day many believe that the

moon does affect the weather, that its movements determine the best time to plant crops, to harvest them, to breed livestock, to castrate young male animals, to irrigate crops, to erect buildings, to set fence posts, to cure meat, dry fruit, preserve vegetables and even when to propagate human life. The moon thus came to me a great controlling factor in nature. While not recognized by scientists, these powers of the moon in some instances receive popular support based on scientific findings, such as: the moon's effect on the tides, the possible effects of planetary radiation and the polarized quality of moonlight. A sure way to arouse ridicule in almost any group is to aver that these pleasant notions, as they are sometimes called, are true. It is not the purpose of this writing to support one side or the other, merely to draw attention to some of them.

It is reported that A. H. Gregory of Miles City, Montana, in his greenhouse secures better yields, improves quality and shortens time of maturity by planting in the right phases of the moon. The fruitful signs of the zodiac are Cancer, Scorpio, Pisces, Taurus and Libra, in the order given. He differentiates between crops grown above ground and crops grown under ground, and lists dates throughout the season when it is best to plant.

A direct correlation has been drawn by Dr. H. J. Franklin between the extreme northward inclination of the moon and the scarcity of eelgrass in the North Atlantic ocean. Quoted in the same article is the oceanographer Patterson who has developed the theory of a regular periodicity in the ocean currents. Also H. W. Harvey, who observes that the gulf stream is at its highest when the moon is at its inclination. Temperature changes, food supplies and the introduction of toxic substances due to ocean currents might easily affect marine life.

The experiments of L. Kolisko, a German woman, seem to show that planting two days before the full moon gives better germination, heavier crops, better flavor and texture. The chief explanation is that the moon's influence is at its maximum. One writer says: "Through many years of practical gardening we find atmospheric and soil conditions are the decisive factors in successful planting rather than the time of the moon." Another writer found planting tomatoes between the third quarter and the full of the moon produced more healthy and vigorous plants and larger fruits. Still another says that planting by the moon for 30 years shows that pole beans, corn and potatoes do much better if planted when the moon is new.

Many of the old beliefs appear in different forms; some common versions are:

Crops producing yields above ground should be planted during the increase of the moon while in a fruitful sign, Cancer, Scorpio or Pisces, especially the second quarter.

Underground crops should be planted in the third quarter which is after full moon or at its waning, but if leafy crops are wanted, as tops of beets or turnips, then in the second quarter.

Planting in the new moon tends to increase woodiness, while the full moon produces plants that are almost free from this point.

Plant potatoes at the new moon so they will grow rapidly as the moon waxes stronger.

Seed exposed to the polarized light of the moon before planting will germinate better than that exposed to the sun, but planting time does not matter.

Destroy noxious growths in the fourth quarter (while the moon is waning) and in a barren sign, Leo, Gemini or Virgo. This also applies to destroying pests, vermin and rodents.

Cultivate in the barren signs.

Root crops will keep better if harvested when the moon is growing old (in the fourth quarter).

Sauerkraut should be made after full moon when it is in a fruitful sign.

Kill the hogs at new moon so the fat will not shrivel when the pork is fried.

Avoid baldness by cutting the hair at the right time of the moon.

The full moon may be powerful enough to induce early decay.

Dig post holes at the right time of the moon (the source did not state what time that is), so the frost will not heave the posts out of the ground.

The American Indian cut trees for his canoes only in the dark of the moon since the wood was less subject to worms and rot.

Irrigate and dig wells when the moon is in the watery signs.

When the moon is lying on its back, it is a dry moon becauses it is holding the water, not spilling it, result dry weather. But others say, it is soon going to pour out the water and bring wet weather.

If at full moon the soil is dry, the forces of the full moon cannot develop the effect on the plant because the conducting medium is lacking.

The most satisfactory results are when the full moon forces can be exerted on a moist soil.

It is obvious that not all these sayings are given in full detail, some interpretations are contradictory and they are not always made entirely clear. The moon change is a continuous process and the moon is full only for a short time, before it is again increasing, after decreasing. Examples of the more exact statements also are: "The new moon, May 24 (1927) arises with Cancer on the 26th, 27th, 28th, best days to plant cotton and beans." "August 18 (1927), last day of old moon, and the moon in Leo, sure death to thistles cut at the root."

Entirely erroneous statements were also common as: "I knew we were going to have a storm last night the moon rose way around to the northeast and the night before way around to the southeast." This just could not happen on two successive nights.

The Fall Vegetable Garden

By Roger W. Smith

WITH the close of the garden's summer activity, many very pleasant tasks and not a few new problems face the victory gardener.

Briefly, these can be divided into two classes. First, the harvesting and storage of the products of the garden. Second, the cleaning-up and preparing of the garden itself.

The first cool days of fall will usually find you with a surplus of root crops, carrots, beets, turnips, and cabbage. Likely as not, you will be without suitable storage space. To overcome this difficulty, it is a very simple matter to make an outdoor storage pit on a small scale.

A barrel may be filled with clean carrots and placed on its side in a shallow trench that has already been lined with straw. The open end of the barrel is then plugged with straw and the whole thing covered with at least six inches of straw or similar material. Over this is thrown a layer of three or four inches of earth. After freezing begins, at least enough earth is added to make a layer a foot thick.

The important thing for you to remember, is to make the covering over the stored vegetables deeper than the distance usually penetrated by the frost in your locality.

Of course, squashes, sweet potatoes, and onions can readily be stored in the house at room temperature or a little lower.

Some vegetables, however, survive much cold. You will find it best to leave parsnips and oysterplants where they grow. Their flavor is improved by frost. They can be dug during the winter when weather permits.

One of the most pleasant occupations during dull winter days it to dig clean, white parsnips and wonder why they haven't perished along with most of the other plants that grew so bravely until frost cut them down. Or to become suddenly aware of the brightness of the green of a little row of parsley.

If a considerable quantity of roots are to be stored in the open, a trench a foot deep and five feet wide—and as long as may be necessary—should be dug in a well-drained place. This trench should be lined with straw and the material to be stored placed carefully in a conical pile or ridge. This pile is then covered with straw the same as the barrel-pit.

In using either of these methods it is best to use only roots that are sound, dry. and not frost-bitten. It is generally best to place them root-ends up. In storing cabbage, this is very necessary in order to secure proper drainage for the heads.

Celery and leeks may be stored outdoors for some weeks by burying them in a small trench. They need only be covered with sufficient earth to bury them until only a couple of inches of the tops is left exposed.

Another very convenient

method of storing such roots as carrots and turnips is to wax them.

Only the most perfect roots should be selected and these could be thoroughly cleaned and scrubbed. Use paraffin wax, similar to that being used about this time of year for covering the jars of preserves—for fall is also the time when the victory gardener's wife is busy in the kitchen putting up the preserves.

The roots are dipped into the liquid (but not boiling) wax and immediately removed. They will cool almost instantly and will have received a thin but complete coating of the wax. This coating prevents the evaporation of the contained moisture and as a result the root may be stored in the house at room temperature for a very long time without drying out.

Green tomatoes make excellent pickles. But if left on the vine until frost hits them may be ruined overnight. For this reason, they usually arrive in such quantities and so suddenly in the fall that they become a problem.

However, they can be picked over, sorted and wiped carefully. After the largest and best have been chosen, one is individually wrapped in a clean piece of newspaper. These wrapped, green tomatoes can be packed in shallow boxes or other containers and then stored in a dark place at house temperature.

In a few weeks, many of them will have ripened and can be used, whilst the rest remain in storage until they, too, color properly.

Before freezing time, the garden should be cleared and spaded thoroughly. This is much better practice than sowing winter rye for the doubtful benefit of the cover crop.

It is even worse practice to merely put off digging the garden until spring, for anything which prevents the fall preparation of the garden makes it that much easier for a vast number of ills to thrive in it.

Innumerable varieties of insect pests will overwinter in or near the surface of the ground if given an opportunity. The pupae of the destructive grape-berry moth hibernates under fallen leaves. Many of the damaging leaf hoppers do the same. The list is almost endless.

And even worse, many damaging molds, notably the black and brown rots of various fruits, exist through the winter in the fallen and mummified fruits which they have destroyed during the summer.

It is clearly the height of folly, then, for the victory gardener to encourage these pests by neglecting to clear them away or bury them so deeply by spading the surface that they are unable to survive.

All material removed from the garden should be composted. This treatment, if properly carried out, is quite destructive to all insect and fungus life adhering to the material composted. The process breaks down the structure of the material composted. It is obvious, then, that the process must have the same result on any organic material regardless.

Fall is the time for clearing up the garden. It is also the time to save the big sunflower heads, to hang them up in the winter when the wild birds need them.

Fall in the garden is also the time for stock taking and planning. It is the time for looking over the fruit trees.

If you have none, they can best be planted in the fall, for no victory garden is complete without a couple. If you have room, you might also try out one or two nut trees, chosen according to your locality. For, after all, fall is also the time for picking apples, for gathering walnuts and roasting chestnuts.

Later, when the trees become dormant, the good gardener faces the problem of giving them the necessary care.

Dormant care of a couple of small fruit trees can become an anticipated pleasure. Proper pruning is not a difficult matter, although so much has been said about it that you might at first approach it with grave doubts.

In pruning an apple tree, for example, if you will remember to remove all dead and broken branches, and to thin out excessive shoots from the center of the tree so as to let as much sunshine as possible penetrate into the middle of the tree, you will have done much.

The same is approximately true of the peach and the cherry. But the pear is a bit touchy. It is best to prune a pear tree as little as possible and to permit it to assume the pyramidal form to which it grows.

To make it easier the following year, it is best to make each cut, when pruning, just above a bud which points away from the center of the tree.

The main thing, though, is to be interested in the tree and its growth, to admire and fuss over it, and the tree will reward you. The same is true, too, of the garden itself. If you

interest yourself in it, or some special phase of it, you will soon be reasonably successful in that phase.

You have probably heard the problem of the gardener with the two identical fruit trees. He was very fond of one and disliked the other. Each day he spoke kindly to the tree he liked and scolded the one he disliked. The tree that was spoken kindly to bore heavily, while the other soon failed and in a few seasons dwindled miserably.

You can demonstrate this problem if you wish. And being capable of demonstration, the problem should be a scientific fact. Fortunately, it is not. As you have probably already guessed, the tree that the gardener spoke kindly to, he also *treated with care.*

That was the essential difference.

If you have a neighbor who has a fine grape vine and you think about planting a few grapes along the fence row, the fall is the time to do something about it. When your neighbor prunes his vine, secure some of the prunings from him, or secure some of the vine soon after it becomes dormant.

Cut these lengths of vine into pieces three points long. Make the lower cut quite near to the lower joint but not through it. Tie these pieces into bundles of a dozen or so each, all butts the same way.

In a well drained spot, dig a short trench sufficiently deep so that the cuttings can be buried in a vertical position and still be covered with about six inches of earth.

Bury the cuttings upside down, that it, butts up. Firm the spot thoroughly and mark it clearly with stakes.

The cuttings will remain there in their inverted position until the spring. They can then be dug up and planted in their natural position in a prepared trench along the fence row.

If you are careful to see, when planting them out that only the top-most bud is exposed, and cultivate them properly, enough of them will grow to cover the fence.

The fall is also the time to look around your countryside and select an especially desirable apple tree from which to secure a few twigs. All the more so if you have a few wild, seedling apple trees growing around the garden.

These gathered apple twigs can either be buried in the ground or otherwise cold stored until later in the spring, or they can be given a coating of wax and stored in the house. Then, in the spring, after growth has started in your wild seedlings, you will have material with which to try your mind at whip, and tongue, and cleft, grafting—and have lots of fun at it too.

In case you are eager to start right now, you might try another method. It sometimes works very successfully. Bud the seedlings to be worked immediately, applying the buds from the apple twigs and using the T-bud method. The idea is for the buds to remain dormant along with the rest of the seedling until spring when they will begin growth.

As soon as frost arrives in the garden, it is time to think about applying winter protection for such doubtfully hardy plants as the boysenberry.

Generally speaking, winter protection is a simple matter. But it can become a very complicated thing unless one very simple matter is understood.

The plant to be protected is permitted to freeze, but by having been covered, it is prevented from alternately freezing and thawing later on.

This covering can consist of almost anything, but the branches of the bush or plant, should if possible be laid on the ground. A foot deep covering of long, dry grass or straw is placed lightly over the branches. Some twigs or brush are applied to keep the covering in place against possible winds. Then a rough layer of evergreen boughs or hedge trimmings should be applied.

Currants and gooseberries can be pruned in the late fall, although with raspberries this is often left until the early spring.

Advocates of the spring pruning, claim that it is best to wait and see how much damage frost has done before pruning away more; and those on the other side of the fence, claim that it is best to prune in the fall and eliminate the danger of carrying diseased material and insect pests over to the spring.

Generally speaking, currant and gooseberry bushes should be pruned according to size and vigor. You will find it best to cut away any obviously dead or diseased parts clear to the ground. Keep each bush with a dozen or so healthy, over-a-year-old branches. Bearing in mind that the fruit it always born on the growth of the year before.

As winter closes down, you will find much pleasure in planning your garden for the forthcoming year. When the snow is piling high and you are comfortable over a warm fire, you will find much satis-

faction in selecting things to plant, in choosing desirable items from colorful catalogs.

At such times as these, it is worthwhile to pay occasional visits to the garden. There still remain little things that can be done and which will give you joy in the doing. Not the least of these, is to get a couple of dried sunflower heads and pass them along to the wild birds. Little things, such as securely tacking half a dozen discarded berry baskets to a long lath and then nailing the lath to the top of the fence rail, to make a place to deposit the sunflower seed so that the birds can get at it without losing most of it in the snow.

Little things like these can give you pleasure and not be the least of the satisfactions your victory garden can bring you.

Good luck to you.

The Use of Mulches

Reprinted from HORTICULTURE (Boston, Mass)

MULCHING is a garden practice which deserves special consideration this season, when amateurs are trying to operate larger vegetable gardens than usual. One of the principal advantages of mulching so far as it affects the garden maker himself, is the fact that it greatly reduces the amount of work involved in the care of the growing crops. Little, if any, cultivation is required after the mulch has been applied. Weeds are kept in subjection without the use of the cultivator or the hoe and moisture is retained, thus doing away with artificial watering, which might be needed under other circumstances. You may even take a two-weeks' vacation and yet find your garden in good condition when you return.

Much has been written in the past about a dust mulch and its effect in preventing the loss of moisture. Dust mulches are formed by keeping the surface of the ground cultivated so that the soil is loose and soft. It has long been believed and, indeed, stated by the experts as a positive fact, that loose, finely pulverized surface soil might become very dry in itself but would keep the soil under it from drying out. It was argued as a corollary, of course, that soil which becomes hard or bakes in the sun would dry out rapidly. Such baking or caking often follows a hard rain if the sun comes out brightly afterwards and, therefore, garden makers have been told to make a special point of always cultivating the soil after a rainstorm.

These theories are now being questioned. Some experts say that much more loss of moisture is caused by evaporation from the growing plants than escapes through the soil, regardless of its upper crust. It is argued out further, that the danger of destroying the roots of growing plants in the spaces between the rows always exists when cultivation is carried on unless it is kept at the very surface. Therefore, the question of providing a dust mulch is open to debate and offers an excellent opportunity of presenting the argument for mulching by artificial means.

Even this practice is not new. There are sections of the country where acres of corn have been grown under mulch. Potatoes can be grown very well in any garden if they are mulched with hay or even with grass clippings. This is, indeed, one of the best ways of treating a potato crop in sod land where cultivation is difficult, but this plan can be followed with any crop on sod land, greatly reducing the amount of work required to keep the grass and weeds in check. Potatoes may be mulched when planted. The plants will grow through the mulching material.

As a matter of fact, there is no reason why the entire vegetable garden should not be operated by this method. The plan has been tried successfully in several instances with excellent results. Peat moss is the most convenient mulching material when a considerable area is to be covered. Also, it makes a neater looking and more attractive garden than most other materials. On the other hand, it is more expensive than grass clippings and

such taller grass as may be mowed around the home grounds.

There are other mulching materials which may be useful and cheap in some sections. Sawdust and shavings are among them, but should have limestone mixed with them except in limestone areas. Sawdust mixed with limestone and with fertilizers, too, or with manure, provides a first-class mulch, but should be spread only one inch thick. Cured hay may be used but is likely to introduce weed seeds. Straw is often used by farmers but may be a fire hazard. Care should be taken not to drop a match or lighted cigarette in a garden mulched with straw. Shredded banana stalks are fairly satisfactory if they can be obtained. Marsh hay when cut into short pieces is very satisfactory, except that it does not disintegrate quickly when dug in.

One of the newest and one of the best mulching materials is found in crushed corncobs. They have about everything a mulch should have, but are none too plentiful as yet and perhaps a little expensive. Glass wool is being experimented with as a Summer mulch but it costs too much for general use.

Several years ago the use of paper mulches was advocated, their value being deduced from the fact that they are used commercially in a large way in Hawaii. In a garden practice, however, they have not proved very satisfactory, as they exclude the air and are hard to keep in place. Tar paper or heavy building paper is excellent for spreading over areas where it is desirable to kill out the grass or weeds.

What material is to be used for mulching purposes is something for the garden maker to decide. Let it be assumed, however, that peat moss has been selected. The peat moss now available comes from American sources but it is not essentially different from that which formerly was imported from Holland or Sweden. If it is caked into a hard mass when received, it must be well soaked with water before it can be thoroughly broken up. The best plan to follow is to leave it out-of-doors where it will be exposed to all kinds of weather unless, of course, it is to be used at once. Then, the hose must be relied upon.

Peat moss can be used in any part of the garden or in all of it, being spread between the rows to a depth of from one to three inches. The deeper it is the less opportunity there is for weeds and grass to appear. This makes all cultivation unnecessary. The mulch also serves to keep the soil from drying out. At the same time, peat moss is porous enough to permit air to circulate through it. At the end of the season the material may be dug in, thus adding organic matter which will improve the physical condition of the soil the next Summer.

Just how long this practice of applying peat moss and digging it into the soil can go on is, however, a question open to argument. This practice has long been followed by rose growers, who cover their beds with peat moss about the middle of June or the first of July, thus keeping down weed growth and doing away with the necessity of working among the plants when they are in bloom.

Experience has shown, however that the soil becomes too porous after peat moss has been dug in for two or three years. It then is in such a condition that it will not retain moisture, but dries out more quickly than soil which has not been treated in this manner. The part of wisdom seems to be to stop digging in the mulch after two years. The method to follow after that is to rake it off at the end of the season, storing it for use the next year.

The practice to be followed in the vegetable garden should be similar to that recommended for the rose garden. The mulch should not be put on until the season is advanced sufficiently far for the soil to become warm and for all of the early crops to be well up. The surface soil should first be cultivated to free it of weeds. The only disadvantage to this general practice is in the planting of succession crops, for it then becomes necessary to remove the mulch temporarily while re-seeding is being done.

Now suppose the garden maker prefers to use grass clippings, perhaps because he has a large lawn and clippings in abundance. The practice to be followed is not different in most of its details from the one just described as applied to peat moss. However there is one point to be kept in mind. Fresh grass clippings heat quickly unless spread thin. A mulch of grass clippings should not be more than an inch in depth until the clippings have dried out, when they will no longer heat and more may be added. If the grass clippings or grass which has been mowed is left in the sun to be cured, any amount can be used. In any event, grass clippings have a tendency to disintegrate rapidly when exposed to heavy

rains and the hot sun. A mulch of this material will need to be renewed at intervals, whereas peat moss will remain a permanent mulch throughout the Summer, being little affected by the elements.

There are certain vegetables which make a notable response to mulching. The tomato in particular gives such excellent results when mulched that this practice is followed on a large scale by many commercial growers. Therefore, mulching of tomatoes is recommended even when this plan is not followed in a general way.

The mulching of strawberries in the Fall for Winter protection is followed by most good gardeners. This mulch may be raked between the rows in the Spring to keep the strawberries clean. Straw is commonly used but some growers who live near forest lands use pine needles. The latter material makes an excellent mulch but has a tendency to produce an acid reaction, and for that reason is not recommended in general garden practice.

Melons, squashes, pumpkins and other vegetables which lie on the ground in victory gardens can be saved from rotting by using straw as a mulch. These vegetables are attacked by molds which cause decay to set in if they rest on the ground. Placing straw under them soon after they begin to form on the vine will keep them comparatively dry and in most cases prevent the rotting of the fruits.

The Water Requirements of Plants

QUITE recently we came upon the latest edition of "Soils and Fertilizers" by Firman E. Bear, Ph. D. (John Wiley & Sons, Inc., New York). The third chapter, "The Water Requirements of Plants" is most engrossing.

Here you will read of the connection between rainfall and crop yield. Almost surely, in this third chapter, you will learn some new and interesting facts. For example, although you knew that water was the solvent in which food material was carried to the plant, the value of water because of its transpiration through the leaves of the plant and the manner in which this regulates the temperature of the plant will probably be interesting.

Several hundred pounds of water are usually lost through the leaves of plants for every pound of dry matter (hay, etc.) produced. In addition to the immense importance of the water which passes from the plant, the plant itself consists very largely of water. Most garden vegetables contain very high percentages of water, tomatoes 95%, cabbage 93%, corn 75%.

Under such circumstances the condition of the soil must be such that it will unfailingly provide the plants which grow upon it with an adequate and essential supply of water. If the soil is such that it cannot provide these relatively huge quantities during the time and under the conditions demanded by the plants, the plants wilt, fail to produce a crop, or even die outright.

Since the water holding and water supplying quantities of the soil are of so great importance, you will naturally study especially Table 13 and the closing paragraphs of this remarkable chapter.

Here you will find demonstrated, as you had probably suspected, that whilst the amount of water transpired during the production of a pound of dry matter is quite large, the amount is much less on good soils than on poor ones. As Dr. Bear puts it in his succinct style: "The data indicates that one pound of water will serve to produce twice as much crop on a good soil and in a favorable season as it will under unfavorable conditions of soil and weather."

Table 13 shows that poor soil to which manure was added not only needed half the amount of water but produced more than three times the crop produced by the unmanured area. This is a wonderful demonstration of the water supplying improvement brought about by the addition of a very small amount of immature humus (manure).

The vast improvement brought about by the addition of such a small amount of imperfect material will likely

cause you to wonder how much greater the improvement might have been had the materials used been more perfect. What would have happened had a relatively large amount of mature compost humus been substituted for the sprinkling of raw manure?

Dr. Bear's book has much to recommend it to the organic gardener. In the forword he states: "Lime and fertilizer alone do not meet the requirements in building up poor soils. One cannot substitute chemicals for sod and its soil-improving effects." You reflect that compost humus is even more effective than sod ploughed under.

"In China. . . clover and mud are used for compost purposes, these materials being arranged in alternate layers and well compacted. When the fermentation process has taken place, the compost is spread over the land and subsequently worked into the soil."

The Rotation of Crops

AS a practical gardener, you might decide to look into the matter of crop rotation. Logically you will seek the reason for its practice. It is agreed by the best authorities that if any given crop is grown for a number of years in the same field the soil sooner or later loses its friability, becomes liable to crust, becomes lumpy, and eventually loses its fertility. The crop fails.

But, you ask, if artificials are all they are claimed to be why shouldn't it be possible to find out just what chemical—nitrogen, potash, phosphorous, etc. —is lacking? Why not just go ahead and supply the lacking chemical? The same authorities who tell you about the necessity for crop rotation because of increasing loss of fertility of the soil through monoculture (one crop system) were the ones who also extolled the value of artificials and carefully explained to you that the humus was useful merely as an anchor for roots and as a medium through which could be conveyed the chemical salts (artificials) necessary for plant growth.

In learning the reason for crop rotation you run into a very curious situation and one which must have called for a lot of subterfuge on the part of chemical gardeners to explain away. Immediately following their extravagant claims about artificials they had to admit the inestimable value of humus. They had to admit, and they do admit quite frankly when discussing crop rotation, that whilst organic matter (humus) usually forms only a very small part of ordinary soil (sand, clay, gravel, etc. bulking high) this organic matter is of vital importance to plant growth. Forgetting for the time being their claims about artificials, they tell you that this organic matter is *essential to plant growth.*

You are told that composted material and green manure have much value when added to the soil. You look over briefly the benefits of crop rotation:—

1. No particular type of plant food is in continuous demand year after year.

2. A different form of tillage is practiced each year.

3. Additional humus is added to the soil.

4. Each crop leaves the soil in a better physical condition for the following one.

5. Additional humus is supplied by each crop for the benefit of the following ones. This is very markedly so when green manure or compost humus are ploughed in.

Note the great stress upon humus, organic matter, composted material, green manure. This strikes you as strange coming from sponsors of chemical gardening methods. For the time being, the perfect, all-purpose, chemical fertilizer has been forgotten.

You go deeper into the matter and find that the cause for the lack of fertility, always found in a field planted down year after year to the same crop, is brought about by the using up of the organic matter in the soil by the crop.

Fertile loam consists, as you know, of the remains of former plant growth plus the mixture of sand, clay, gravel, etc. upon which the plants grew. This broken down plant growth may be either partially or completely decomposed. Regardless of its condition, it is being further broken down by the action of innumerable microscopic forms of life. The action of these tiny creatures will eventually turn the material into that very complex and very valuable substance, fertile humus.

The microscopic flora of the soil is composed almost exclusively of simple, single-celled plants (bacteria). They increase swiftly by division. Several billions of the different varieties may be found in a cubic inch of fertile loam.

The reason for crop rotation, you have found, is brought about by an increasing lack of organic matter in the soil, an increasing lack of material for the soil flora to work upon and render available for plant use. This, of course, causes you to wonder. Is not all this a left-handed admission by the best authorities that organic gardening methods have much to recommend them?

But you are primarily a practical gardener. Garden crops must succeed for the use of yourself and your family. In these days they are essential. So you turn to the more practical aspects of rotation.

Here you find an almost unlimited choice of systems. There are one year plans, two year plans, three and four year plans in abundance. One method is to allow one third of the garden space to be planted down to clover or some other legume each year.

In one of the simplest combinations, the garden is divided into three sections.

Section 1. Roots (potatoes, beets, turnips, etc.).

Section 2. Seeds and fruits (Tomatoes, peppers, sweet corn, etc.).

Section 3. Leaves (Lettuce, cabbage, clover, etc.).

If the garden is planted as above the first year, then the second year each section is changed. That is, root crops are planted in Section No. 2, seeds and fruits in No. 3, and Leaves in No. 1. The third season, another shift is made, and the line-up returned to its original position with the planting of the fourth season.

The reason for this general division will probably be clear to you. The root crops with their very deep seeking root systems leave the soil generally in a better physical condition for leaf crops. Corn and other hoed crops tend to eliminate weeds. And the surplus of leaf crops left in the field and ploughed under add available nitrogen to the soil.

As you might have suspected, fall planted crops tend to hold and develop plant food material. They prevent its too rapid loss through the leaching action of rains.

The important thing about any system of crop rotation is that the crops must be very different both in type and culture. If the proper interchange of types is carried out many indirect values accrue, for example, soil rendered sour through the growth of one crop may be sweetened by the next, or a crop very subject to insect attack may be grown on ground known to be quite free from hibernating pests.

It occurs to you that the use of compost humus in the garden is a form, and perhaps the very best form, of rotation. If sufficient mature compost humus is available it is seldom necessary to use any drastic form of crop rotation. The planting and digging under of winter rye and the careful management of the garden do much to make the plant food produced by the gradual breaking down of organic matter easily available for following crops.

Looking into this matter of the rotation of crops you have found that it is openly admitted by those who most favor the use of artificials that the soil (humus) is the greatest source of available plant food. It is explained that although much of this food value may not be immediately available, the rotation of crops will render this material easily accessible to growing plants.

All of this is a bit puzzling. Why don't they recommend an additional dose of artificials? The answer, you have realized, is that artificials are parasites. They succeed only when there is ample natural humus and plant food available. They are plant stimulants. Healthy plants need something more than a saturated solution of chemical salts for their healthy existence, for the production of health giving food substances for your use.

So you have discovered, after much investigation, that the great importance of crop rotation consists in the fact that it adds humus to the soil and renders the soil more friable and workable. Nothing new, surely, to one accustomed to the organic method and the use of rich compost humus.

You review crop rotation and reflect that the idea of shifting the location of any given crop to prevent the exhaustion of the humus in which it grows is quite a natural thing.

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Pages 24 and 31 in this issue have been interchanged by error. After finishing this page turn to page 31 (marked 24).

Unless the humus is replaced by fertile material from the compost heap, the crop should be grown in a new location.

This is only natural for in the wild, plants are constantly seeking to shift their location. This movement may be accomplished through the dispersion of seeds (maples, thistles, etc.) by extensive root growth and suckering (lilacs, spear-grass, etc.) and by several other methods. The plants growing in their original home sooner or later fail and those in newer, more congenial circumstances succeed and multiply.

But with all the interesting issues involved in this matter of crop rotation and its close relation to the natural growth of garden plants, you will likely find the most striking feature of all is the candid admission, out of a vast literature extolling the use of artificials, of the vital value of organic matter in the growing of crops, the essential importance of humus.

Any explanation of crop rotation must by its very nature concede to the principles laid down in the practice of organic gardening.

Sea-weed As Manure

DEPT. OF AGRICULTURE (Dublin, Ireland)

At many places along the sea-board, and on most islands off the coast, several species of sea plants are found growing, some of them on rocks that become exposed between tides and others on rocks outside low-water mark. Owing to the action of the tide and during stormy weather, the plants get detached from the rocks and stones on which they grow, and may either be thrown up on the beach close at hand, or carried a considerable distance before being washed up on the shore. Sea-weed thus cast ashore is known as drift-weed, and especially after storms, is found in considerable quantities, strewing the beach several feet deep.

The term cut-weed or cut-wrack is applied to the plants that are found growing between high- and low-water mark. The plants which have to be cut or shorn off the rocks when the tide is at ebb are usually richer in fertilizing ingredients than drift weed or weed found near the high-water mark, or adjacent to fresh water.

At one time sea-weed was extensively collected, dried, and afterwards burnt. The ashes, called kelp, were sold for industrial purposes. Kelp-burning used to be a source of considerable revenue to small farmers and others along the sea-board, but for a number of reasons the industry has lately declined considerably, and in many places has become practically extinct.

Sea-weed is a Complete Manure

The chief use to which sea-weed is now put is to manure the land and in some districts it is carted long distances for this purpose. Like farmyard manure, sea-weed is a complete manure; that is, it contains the three principal constituents which are of value as fertilizers, namely, nitrogen, phosphate and potash. As drift-weed usually comprises a number of species of plants, it varies considerably in its composition according to the species which predominates, the amount of water it contains, and the quantity of sand that is mixed with it.

Sea-weed and Farmyard Manure

A comparison of fresh sea-weed and well-rotted farmyard manure shows that sea-weed contains about the same quantity of nitrogen, a good deal less phosphates, and about double as much potash. The comparison in this case is made with manure from cattle that have been fairly fed, and with straw used from litter.

Special Value of Sea-weed

Over and above the value of its nitrogen, phosphate and potash, sea-weed, like farmyard manure, has a special value in improving the mechanical condition of the soil. It supplies a large quantity of

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organic matter, which is of the utmost importance on the light gravelly and sandy soils so frequently met with along the seaboard. In very dry weather this organic matter helps the retention in such soils of moisture without which the crop might be a failure no matter how well stocked the land might be with the different manurial constituents. The light soils here referred to are generally deficient in potash, so that sea-weed, which contains a large amount of this ingredient in a readily available form, is specially adapted for supplying this want. Seaweed rots more rapidly in the soil than farmyard manure, and as a result its effects are therefore not quite so lasting. When used in conjunction with artificial manures it should be borne in mind that it is deficient in phosphate and rich in potash; therefore, manures containing phosphates such as superphosphate, basic slag, or mineral phosphates, which are comparatively cheap manures, should be used along with seaweed, while potash manures should be used sparingly, if at all especially where large quantities of sea-weed have been applied.

Application of Sea-weed

Where Sea-weed is plowed down early in the Autumn, particularly on light sandy soils, part of its fertilizing material is liable to get washed away before Spring. In some districts sea-weed collected in the Autumn is stored over Winter in a heap separately, or mixed with farmyard manure. Where this system is adopted losses also occur, and in general it will be found most convenient and economical to apply the sea-weed direct to the land and plow it down. In order to save expense in handling, the sea-weed should of course be left to become partially dry before it is carted to the land.

Sea-weed as a Manure for Potatoes

Sea-weed can be used with advantage for every crop on the farm or garden to which farmyard manure is applied. Owing to the large quantity of readily available potash it contains it is specially suited for potatoes. Where large quantities of sea-weed alone are applied to the potato crop, the tubers are inclined to be waxy and not of good table quality as compared with those grown on farmyard manure. The ploughing in of sea-weed the previous autumn, and the application of superphosphate or similar phosphatic manure in Spring, have the effect of considerably improving the table quality of the tubers. An effort should, therefore, be made to get as much as possible of the sea-weed ploughed in before seed time.

It is sometimes held that freshly applied sea-weed exercises an injurious effect on the potato sets, particularly where cut seed is planted, but there is no proof that this is so. On rare occasions, however, it has been found that a proportion of the tubers failed to grow where the cut "sets" were planted directly on sea-weed which had been applied to the land in a fresh condition and which had become, in the absence of rain, partially dried out before planting. In general, however, it may be said that sea-weed, under normal conditions, does not injuriously affect potato sets, and such failures as occur where the crop is manured with sea-weed may be ascribed to causes other than the manuring.

Experiments extending over a number of years have been carried out by the Department at centres in seaboard localities to determine:—

(a) The relative values of farmyard manure and seaweed as manures for potatoes.

(b) The most suitable artificial manures to use in conjunction with sea-weed.

The results obtained were very uniform throughout the series and would seem to indicate:—

(i.) That a dressing of 15 tons of sea-weed per statute acre does not produce quite as heavy a crop of potatoes as a similar dressing of farmyard manure.

(ii.) That when sea-weed is used instead of dung for potatoes, it should be supplemented with a mixture of artificial manures composed of 1 cwt. sulphate of ammonia and 4 cwt. superphosphate per statute acre.

(iii.) That the addition of superphosphate to a moderate dressing of sea-weed not only increases yield, but improves the cooking quality of the potatoes.

Sea-Weed and Mangels.

Mangels are also specially benefitted by the application of sea-weed. In addition to the three principal manurial ingredients already mentioned, it contains a large quantity of salt which is so beneficial for this crop. When used for mangels, the sea-weed should be ploughed in during autumn or winter. By seed time the bulk of it will be decomposed and ready to force the young plants

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through the critical stages of early growth. In some districts it is also applied as a top-dressing in the bottom of the drills after the seed is sown. While this helps to conserve the moisture which is so essential in the early stages of the plant's growth, it interferes with the free use of implements for some time after its application.

Sea-Weed and Cabbages

Sea-weed also makes a capital manure for cabbages, whether grown in the field or garden: in fact it is scarcely possible to overdo the quantity that can be used for this purpose. It should be ploughed or dug into the soil any time from autumn till early spring when the land is in suitable condition for working.

Sea-Weed and Grass

It can also be very profitably employed for top-dressing young grass or first year's seeds, especially where there is a good mixture of clover along with the grass. Its effect on this crop is very striking. Where applied early in the season it has the additional advantage of sheltering the crop from frost during the winter, and from the harsh spring winds later in the season. The result is generally a very heavy cut in spring, at a time of the year when green food is most required.

Sea-Weed and Turnips

It is also used as a manure for turnips, but as the dominant manurial ingredient for this crop is phosphate, and as sea-weed is deficient in this constituent, it is essential, if the best results are to be obtained, that superphosphate basic slag, mineral phosphate, or other phosphatic manure should also be used in conjunction with it.

Since the introduction of artificial manures, the tendency in some sea-board districts has been to rely more and more on these fertilizers and to neglect sea-weed. No artificial manure, however well balanced, can ever take the place of farmyard manure or sea-weed in supplying the bulky organic matter which is so essential on light sandy soils for improving the mechanical condition and thereby conserving moisture. Sea-weed may, therefore, be considered a valuable manure, fulfilling both chemically and physically all the functions of farmyard manure. It can often be procured at little expense at a season of the year when farm work is slack. While it is not possible to fix a definite money value on sea-weed, it may be taken to be worth about as much as farmyard manure of average quality.

Reader's Correspondence

Sir Albert Howard:

Is there any advantage in iron filings in the soil where vegetables are to be planted?

J. I. Rodale

Answer

Dear Mr. Rodale:

I have never had any experience of the use of iron filings in a vegetable garden, but in composting tin cans are often left in the fermenting mass, many of which disintegrate and disappear in the process, so a good deal of iron must become oxidized and get into the compost. I do not think any harm would come if small quantities of iron filings were put in the compost heaps, but as far as I know no work has been done on this subject at all.

Yours sincerely,

A. Howard

Gentlemen:

I have read with considerable interest your March issue of Organic Gardening, especially as to compost building. Not only do I raise some vegetables, but I specialize in Camellias and Azaleas, which prefer an acid reacting soil. Inasmuch as your Indore Process turns out an Alkaline humus, what should I do to make it acid?

Yours very truly,

Louis J. Macchia

San Francisco, Calif.

This question was submitted to Sir Albert Howard who replied as follows:

Dear Mr. Rodale:

With regard to the use of compost for acid-loving plants, I do not think the alkalinity or acidity of the compost makes much difference, because in the tea industry we find compost made according to the Indore Process gives exceedingly

good results. Tea, as you probably know, loves an acid soil and is actually destroyed by dressings of lime.

With regard to the lime and manure used together, the usual practice in farming is to keep them separate—to apply lime in the autumn at a time when manure is not given to the soil. In composting it is far better to use the carbonate of lime, or wood ashes, rather than burnt lime or slaked lime.

Yours sincerely
A. Howard

Mr. J. I. Rodale
Organic Farming and Gardening
Emmaus, Pennsylvania
Dear Sir:

Dr. Lininger, Director of Research, submitted to me your letter of July 14 for reply relative to the weight of a cubic yard of compost and manure.

We have no figures available because of the fact that manure and composts are of such a variable composition that no general figure would be applicable to all kinds of manure or composts.

The reason for this is, of course, that if the manure was chiefly strawy manure a cubic yard would be quite light, whereas, if it was cow manure with very little bedding, a cubic yard would be very heavy. Also composts which, as a rule, are made of various proportions of sand, manure and soil would have a very variable weight.

If you are interested in determining the weight of any particular manure or compost, I would suggest that you take a measure which would contain one cubic foot, fill this measure with the compost or manure in question, and weigh it and multiply the results by twenty-seven. The figure you would obtain, however, would only apply to the particular materials which you weigh and also would be dependent on the amount of packing of the matter into the measuring box.

I hope this may be of assistance to you.

Yours very truly,
C. D. Jeffries
Assoc. Prof. of Soil Technology
Pennsylvania State College
State College, Pa.

Dear Sir:

Since subscribing to Organic Farming I have become convinced you are on the right track. On coming to Fla. from Wis. ten years ago I was struck with the flat taste of most of the vegetables raised here in comparison with those I had raised in Northern Wis. I attributed it to the difference in the soil as I have always looked on Florida's soil as being somewhat dead. I noticed this lack of taste especially in carrots, peas and tomatoes.

Since reading Organic Gardening and reading Sir Howard's Testament I know the answer is chemical fertilizers. While Sir Howard's treatise was well worth the price yet it does not answer all the questions in regard to land management, so I am firing a lot at you. I have 3 compost piles; one nearly ready.

They are made with fish and some chicken manure.

Now we cannot expect the imposible from compost. In other words, it can't have in it anymore than is put into it; the various plant foods namely nitrogen, phosphorous and potash. Now this land of mine is mostly black muck verging on the musky. I have drained it and previous to taking Organic Gardening, I have limed it and treated it to acid phosphate and potash as every one knows who farms that muck is deficient in lime phosphate and potash. This soil is sour and devoid of earthworms except where it verges on the higher sandy land. I have raised some good tomatoes, turnips and beans on this land after this treatment. Now this land in its virgin state is lacking in lime, phosphorous, potash, soil bacteria and earthworms. Just how much of a remedy for this soil is compost and liming to correct the acidity? Can you expect compost to supply the needed potash and phosphorous unless those elements are first incorporated into the heap at its making? I know fish is supposed to have considerable phosphorous but what about the potash? Since it takes time to make compost and I am a new subscriber to Organic Gardening I am not quite ready to try compost farming but will try it on some fall crops like carrots, beets and lettuce which we grow all winter here in Florida. However, in turning the oldest pile for the last time I took about a wheel barrow load of the finest leavings from the pile and put it under some squash and cantaloupe hills.

These have surely made a luxuriant growth so I know there's something to look forward to. I hope in the near future to be able to contribute some worthwhile testimony as to the efficiency of compost. I enclose some questions.

1. According to Organic Gardening methods how would you treat black mucky land that is sour and lacking in phosphorous and potash?

2. If a compost pile is al-

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lowed to become too dry is there a loss of nitrogen and has irreparable harm been done?

3. Are long leaf pine needles called "pine straw" suitable for compost piles? Also spagnum moss and peat?

Respectfully yours,
M. G. Carpenter
Panama City, Fla.

Answer

Dear Mr. Carpenter:

Please excuse the delay in replying to your letter. In reply to your questions:

1. The treatment for most soils is uniform; that is, compost, compost, compost. The simplicity of organic farming or gardening is the fact that in a large majority of cases, most conditions can be corrected by enriching the land with compost. Any other organic means such as growing green cover crops that are plowed under, will help to correct the situation. To attempt to scientifically apply chemicals is not only very difficult but will begin to produce the results that you will get by applying organic methods.

2. If a compost pile becomes too dry and is not corrected soon, there is a loss of all elements, no doubt. The most important effect would be that by allowing the pile to become dry, there would be a delay in the time you finish the compost heap. By applying water if the season is dry, you accelerate the decaying process.

3. I am sure that long leaf pine needles will decay in the compost heap. If it is stubborn, however, then it should be accumulated in a separate pile and treated with an excess amount of water. It should be placed in the compost heap after it has withered considerably. Spagnum moss and peat are as a rule not put in the compost heap, as they are material which could be used directly on your land. Their fertilizer value is low but they are excellent for absorbing moisture and keeping the ground saturated. Some people put peat moss in compost heaps for the purpose of keeping the heap moist.

Dear Sirs:

In connection with making up the "compost" according to the instructions in the pamphlet, there is one point that is not clear to me. You know, I have always used it but did not make it up that way. I simply filled the old basement up and kept it damp, turned it now and then and that's all. It generally took about a year for it to break down that way.

Now to build it up in layers is something else and it seems quite difficult to get it piled up right. I am on my second pile now. The point is, I am having trouble to pile it up in dry layers as the pile gets out of shape and it's hard to put on the fertilizer and the lime, wood ash and dirt between the layers. When you are saving this refuse do you leave it pile up dry and use it that way or, do you keep the reserve refuse pile on damp side and use from that? There is where my trouble seems to be and I will thank you to advise me on that point.

J. Robert Shine
Riverside, Calif.

Answer

Dear Mr. Shine:

Replying to your letter of July 9th, if you have trouble in getting the pile to keep its shape as you make it, start the heap with a very broad base and taper it quite a bit as you go higher. If the base is 12 feet wide, then arrange it so that by the time you get to 5½ feet high, it will be 6 feet wide at the top. Are you using a pitch fork in handling your material? An ordinary shovel is usually hard to handle with compost materials.

With the green refuse material, it is best to accumulate it in low piles and allow it to wither. If there aren't many rains, it would be good to keep these piles wet.

If you are having difficulty with the different layers, it might be advisable to mix the manure together with the green materials thoroughly and apply the mixture to the compost heap, then the lime and the earth.

Dear Sir:

I am delighted with the magazine, the articles being in condensed form permit me to keep in close touch with all of your activities. Having merely started my composting about one year ago, it is a little early to expect too much but I can say that results so far are gratifying.

A few years ago we had a small Avocado grove in So. California and each year I prepared a sort of compost pile. Had a trench 4 ft. x 4 ft. x 20 ft. Collected all the leaves, cuttings, grass and had my friends save leaves from their estates. I placed plenty of straw-board in the bottom, then layers of leaves, wood ashes, manure, and lime. This made a very fine compost if I took time enough to moisten enough and turn over. We kept about 6 in. to 12 in. of this compost around the avocado trees, did no cultivating and used an overhead watering system.

Have been very busy since we are in this war but will be much interested in all of your work.

Best wishes for your success in this very important movement.

Yours very truly,
E. C. Shaler
San Anselmo, Calif.

Compost Heap Holes

M. G. Carpenter of Panama City, Florida sends in the following idea for maintaining the air holes in the compost heap, since many times the holes cave in. Take some long material like rye straw, cornstalks or broom sedge and make into bundles about 4 inches or more in diameter, tied loosely so as not to be too compact. Stand one of these up in each place you want a ventilator hole. They will, if tied loosely, allow enough air to pass up through the pile.

Gentlemen:

How would peat moss from a chick brooder house be to use on my garden?

M. A. Droske
N. Braddock, Pa.

Answer

Dear Mr. Droske:

Peat moss litter from a chick brooder would be very good for the garden, but the inclusion of the chick droppings makes it advisable to compost this litter first before using it. This is especially important with chicken droppings because they have a tendency to burn if used raw.

Gentlemen:

How about using your methods in large scale farming operations? Can you adapt the organic fertilizer to large farms?

A. R. Blanchard
Owego, N. Y.

Answer

Dear Mr. Blanchard:

The idea of farming without artificial fertilizers is practical on a large scale, but it requires a gradual change-over from the old practice. It would not be good business to suddenly decide, on a going farm, to stop using chemical fertilizers if you have to compete and show a profit for the first few years.

Our recommendation would be to take part of the farm and start working it on an organic basis, and gradually add more acreage until the whole farm is covered. At the same time, on the rest of the farm the use of chemical fertilizers could be greatly reduced and such things substituted as ground phosphate rock, bone meal, and other organic fertilizers.

Kimberton Farms, which represent over 500 acres at Phoenixville, Pa., is following 100% the organic method. We are doing it on our 63 acre farm.

The solution to this problem would be the use of green manure crops on a larger scale than is ordinarily practiced, along with composts and other organic methods.

Gentlemen:

Upon receipt of your June "Organic Gardening," the article, "The Fault with Combined Wheat", came to my attention. Being a manager of a flour mill and a dealer in wheat, although our operations are not in a large wheat producing area, it was of much interest to me. Mr. Gardenhire, we believe, is only partly right in his statements.

We do not agree with him that, while the combine has been a boon to the wheat producer, it certainly has been a detriment to the mill. It is not because the combined wheat is not ripe before it is harvested; as before wheat can be binned, it has to be sufficiently ripe that the moisture content will be low enough to store without danger of heating. Most of our combined wheat is harvested with a moisture content of ten to eleven per cent. Where green kernels exist, the moisture will go fifteen per cent or above.

We believe, in regard to the binder cut wheat, which can be cut even greener than combine wheat, that what actually takes place is that as the wheat stays in the field in the bundles and shocks, with the dews and an occasional rain, a beginning germination is set up in the berry. This chemical and physical action—probably what has always been known as the sweat—creates the enzyme diastase, which is the chemical that changes starch to sugar and is essential in flour. Before we had a combine, diastasing of flour was never thought of. Now it is necessary that all flour be diastased through the use of malted wheat flour.

This is the first issue of your magazine that I have seen. We have entered our subscription for a year and believe that we are going to enjoy it very much.

W. K. C.

To Editor of Organic Gardening.

I have an abundance of par-

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tially decayed barley straw. Would this mixed with poultry litter containing poultry droppings make a compost without the use of soil?

Is ground or raw limestone good to hasten decay?

I am told that the fluid from a septic tank after undergoing the bacterial change is perfectly harmless. We have built one and have a small tank receiving the fluid before it enters the distributing bed. This is so arranged that we can pump it out and distribute it to plants and trees. I find that the liquids from our concrete barn floors diluted with water are a wonderful plant grower. Would not the discharge from a septic tank have the same properties? We do not run water from the kitchen sink or bath room into the septic tank. Would it be better to dampen the compost with the septic tank liquid?

How should compost be applied to fruit trees and berries and grapes? Will compost put in trenches this fall for next year's garden be as effective as that put in the spring?

Also, is the earthworm, known as a dew worm, as efficient in soil renovation as those that are bred? My observation has been that where I find a lot of earthworms the soil is soggy and sticky.

Mrs. G. H. Gainer,
Fremont, Ohio

Answer

Dear Mrs. Gainer:

Soil, if possible, should always be used in the compost heap, as it starts bacterial action and will make much better and quicker compost.

Hydrated lime is much better than limestone because the limestone is much slower acting in the compost heap.

Our advice is not to use any material from either cesspool, septic tank or anything to do with human excrement until such time as it is proven beyond question that there is no danger in using such material.

The best way to apply compost to fruit and berry trees is to apply it on the surface of the ground and cover it with straw mulch. Another way would be to work it in gently into the ground and then apply the straw mulch.

It is probably better to put compost in in the fall and if you have sufficient, to put an additional quantity in in the spring. In many cases, compost is not quite in a finished state when it is used and by putting it in the ground in the fall, it decomposes further by the time the crop is put in in the spring.

We have not had too much experience yet with earthworms although the earthworm breeders claim that the bred worm is more active. For all practical purposes I do not think it would make much difference whether the worms are local or bred.

Gentlemen:

If your theory of plant health is due to the proper cycle of bacterial life in the soil not being interfered with, how come the chestnuts were all swept out of existence, whether in yards, parks or woods? The Dutch Elm disease is taking trees in parks and woods. The woods are there natural place. The cycle of minerals, leaves, bacteria and humus is not interrupted. These trees should be healthy and yet they die. Why?

Elmer H. Stayer
Bloomfield, N.J.

Answer

Dear Mr. Stayer:

The question you bring up about the chestnut blight is interesting. In nature you do not always have perfection. In fact, it is a struggle for existence. No one can conceive even in nature of everything being one hundred per cent perfect. There are conditions, that we know nothing about, that might bring about a chestnut blight, but by and large, nature seems to take care of her plants and trees much better than man's plants and trees.

Incidentally, the chestnut blight is believed to have been brought from Japan.

Gentlemen:

The soil here is very peculiar —lots of clay or something. When it is dry it would hold up almost anything, but put a few drops of water on it and step in a wet spot and one sinks half out of sight, and then when it drys again it is as hard as a cement pavement. Strangely enough, by constant working of the soil to keep it softened up, quantities of flowers and crops grow fairly well. I had a back yard plowed up that apparently had never been plowed before and have quite a presentable garden, but the dandelions and a weed that has a round button-like seed on it have kept me busy digging them out and have quite overrun some spots, and there are all kinds of bugs in the soil.

Miss Edith McGann
Goldendale, Wash.

Answer

Dear Miss McGann:

The use of plenty of humus will eventually correct your

condition. There have been spectacular come-backs in cases where land was practically unworkable, by the use of compost.

Dear Sir:

I have 50 acres of hill pasture land on a farm in So. Ohio. Would it be practical to rebuild its fertility with compost? I'm planning an application of 2 tons of lime per acre which the soil needs according to my county agent. He also recommended superphosphate but if compost with the lime would be more advisable how much compost per acre would be recommended?

Is it practical to build a 20 ton compost pile with proper aeration and leave it for 8 to 10 months without turning it? With proper watering would it develop in that longer period of time into the desirable organic matter derived from piles that have been turned as recommended in your regular procedure?

To Americans who are conscious at all of the soil under our feet your magazine "Organic Gardening" can be most informative and entertaining. One can nearly experience a religious reaction in perusing its pages.

Dwight Mutchler
Chicago, Ill.

Answer

Dear Mr. Mutchler:

I was very glad to hear from you. Lime should be used as recommended by your county agent, but superphosphate is an artificial fertilizer, which we do not recommend. In connection with the use of compost, there is practically no limit to what you can use. A good application would be from ten to twenty tons per acre.

A twenty ton compost pile is very practical but as to the number of months it would take to decay without turning it, that would depend on the type of material you use. That is, whether the green matter is thin and would decay readily. Leaves take years as do corn stalks.

Due to the labor shortage, some farmers are not turning over their compost heaps but keep them for one year, at which time they apply it to the land. By that time it may be not quite thoroughly decayed but it has a good start and it will not take much longer when plowed under to finish the process in the soil. It will not quite have the value of finished compost.

Where compost heaps are not turned over, it will probably require from one to two years for finishing.

Dear Mr. Rodale:

I am very much pleased with Sir Albert Howard's book, "An Agricultural Testament" and find so much meat therein that I am thinking of covering my orange grove with compost next spring.

I find I can buy compost, both used and unused, about 20 miles from where I live. It is made and used by a company of mushroom growers who find a market for their product in nearby Los Angeles markets. After growing a crop of mushrooms, in bins filled with freshly made compost, they clean out the bins thoroughly and sell the compost to nearby market gardeners for 50c per cubic yard (slightly less than 2c per cubic foot.).

They will also sell freshly made compost for $1.00 per cubic yard. I don't know what the analysis of compost will show for nitrogen, phosphoric acid and potash (NPK) but I do know that I can buy from nearby poultry raisers, two grades of droppings, viz:—No. 1-Clean droppings (no litter) for 6 and 7 c per cubic foot that analyses 2¾% nitrogen. Also No. 2-Sweepings from the cement floors—containing much litter mixed with copious droppings, for 4c per cubic foot that shows 1½% nitrogen.

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Box C-7 Roscoe, Calif.

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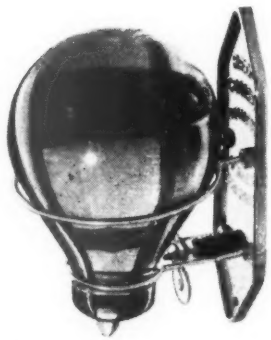

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AN AGRICULTURAL TESTAMENT

By Sir Albert Howard, C.I.E., M.A.
Formerly Director Institute of Plant Industry Indore, and Agricultural Adviser to Central India and Rajputana.

Sir Albert Howard C. I. E., M. A.

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